



Green Library: A Review of Sustainable Development & Operational Practices

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Abstract: This research paper elaborates the concept of green library, the evolution, implementation, and challenges of green libraries, focusing on sustainable practices in library design and operations. A mixed-methods approach that combines a comprehensive literature review of the work related to green libraries has been employed. The study examines both global and local green library trends, identifies implementation barriers, and proposes evidence-based strategies for enhancing sustainability within library systems. 'Green' or 'Sustainable Libraries' are the structure that is designed, built, renovated, operated, or reused in an ecological and resource efficient manner. It's a collective effort of all mankind to make green planet by reducing global warming. Element of Green Library is Site selection, Constructional material, Energy conservation, Indoor air quality, Water conservation etc. Librarians have always been a key contributor to community learning efforts and it is also appropriate that they take a leadership role in sustainability movement. The green library or sustainable is a modern library where minimize electricity consumption and maximum use of renewable sources like air, sunlight, woods. Now days it is much more needed for a library to greening the library environment.

Key Words: Green Libraries, Academic Libraries, Sustainability, Environmental Literacy, Elements of green library, climate change.

1. INTRODUCTION:

The term "green" is widely recognized for its association with environmental sustainability. In this context, the concept of "green libraries" refers to libraries designed with eco-friendly principles in mind. The development of green libraries began gaining attention in the 1990s and became a notable trend in librarianship by the early 2000s. As noted by Singh and Dixit (2021), green libraries encompass the construction of sustainable library buildings, the greening of existing facilities, the provision of environmentally friendly services, and the adoption of methods that promote sustainability within the library environment. Antonelli (2008) highlighted that although the knowledge base surrounding green libraries is still developing, there has been significant growth in literature on the topic, reflecting the increasing global interest in eco-friendly libraries. Today, many libraries around the world are adopting green practices to create eco-friendly spaces that prioritize sustainability. These spaces are designed to minimize energy and water consumption, reduce the overall environmental footprint, and enhance the aesthetic and functional quality of the environment. Such libraries aim to promote both environmental conservation and the well-being of their users.

2. OBJECTIVES :

Main objectives of this Study have given below:

1. Create an environmental awareness among Users.
2. Introduce the Concept of Green Library to Users.
3. Contribute little efforts to make a green earth.
4. Promote green library movement to academic Professionals.

3.Sustainability agenda of a green library:

As per the IFLA Environment, Sustainability and Libraries Section (ENSULIB) sustainability agenda for green libraries may be the following



A *green and sustainable library* is a library which takes into account *environmental, economic and social sustainability*. Green and sustainable libraries may be of any size, but they should have a clear sustainability agenda which includes:

- **Green buildings and equipment:** The emissions, or carbon footprint, of the building and equipment are actively decreased.
- **Green office principles:** Operational routines and processes are environmentally sustainable.
- **Sustainable economy:** Consumption is restrained, circular and sharing economy practices are advanced and are made accessible to the community.
- **Sustainable library services:** Relevant and up-to-date information is easy to access for users, shared spaces, devices, and environmental education is offered, and operations are efficient. The library has a positive carbon handprint.
- **Social sustainability:** Good education, literacy, community engagement, cross cultural diversity, social inclusion, and overall participation are considered. The library works actively to reduce inequality.
- **Environmental management:** Environmental goals are SMART (Specific, Measurable, Achievable, Realistic and Timebound), and the library works to decrease its own negative impact on environment. The library's environmental policy, its implementation and the results of environmental work are communicated to a broader audience.
- **Commitment to general environmental goals and programmes:** Commitment is guided by the UN Sustainable Development Goals, the Paris Climate Agreement and related environmental certificates and programmes.

4. Elements Of Green Library:

There are various paths to achieve sustainability in the libraries and LEED (Leadership in Energy and Environmental Design) rating system is one of them and it was developed by United States Green Building Council (USGBC) in year 2000. Many of the library professionals of today are working on the idea of green library, which will use natural and regional construction material, minimize consumption of water and electricity, and also use environment friendly technology. Main elements of Green Libraries are follows:

Community & Locality:

Library is the heart of any institution. It should be at an appropriate site or locality so as to make users concentrate on their reading or study. Library should be in a perfect locality such as away from the noise zone like club, auditorium, entertainment hall etc. to make patron concentrate on their study. The proper examination of site is necessary for reduction of the pollution from the construction activities.

Constructional Material:

There are many standards and protocols available in India and outside to make a green building by using recyclable and environment sustained materials. IGBC (Indian Green Building Council) is a part of CII (Confederation of Indian Industry), offers a variety of services like green building rating programs, training programs, certification service program, etc. LEED (Leadership in Energy and Environmental Design) is a nationally accepted program planning environmentally compatible high performances green building for a healthy environment. Use of locally available material can reduce the cost and pollution in transportation

Energy conservation:

A library can have sufficient number of windows, glass windows, use of natural light, use of energy efficient bulbs and lights, etc. Even required electricity can be generated using direct sunlight by planting solar system on the roof top of library building. Proper ventilation system should be designed in building for fewer requirements of lighting and air conditioning. Electricity can be generated using direct sun light by planting solar system on the roof top of library building. Use of energy sources which are nonpolluting and renewable energy potential like solar, wind, geothermal, low impact hydro, biomass and bio-gas strategies, etc. Also using of low energy consuming bulbs and lights in non-reading areas during night time indirectly help library financially and save electricity as a whole.

Indoor air quality:

Proper ventilation system should be design for good air quality. The more air ventilator planned the more it reduces the electricity consumption. There are various Plants which filter air of the building like spider plant, aloe Vera, Boston fern



and English ivy etc. Inside the library building there is the need of a quality air. For this proper plantation is needed in the surrounding campus, which provides clean and pure air and also make library a cool place. Also trees gives pleasant air and it control air conditioner operation during summer.

Water conservation:

There are many different ways for libraries to conserve and make optimum utilization of water like rainwater harvesting system, use of low flow fixtures, and waterless urinals. Moreover, library can reuse of waste water and rainwater for plantation and gardening, and for flushing in toilets. By looking in to the matter a library can reuse of waste water and rainwater in plantation, harvesting and flushing in toilets. Design the building sewage system which uses waste water or non-potable water. A water tank could be designed for storing rain water, recycled grey water, or treat water for sewage conveyance

5. Sustainable Practices:

Sustainable Practices in libraries focused on such techniques that are applicable for minimising negative impact on the environment. Sustainable libraries adopt various ecofriendly practices.

- Eco-friendly preservation techniques are used by sustainable libraries, such as nonacidic papers, organic repairing materials like adhesive, boards, papers for binding and repairing.
- Library buildings are eco-friendly with proper natural light. Designing with large windows to maximise natural light, it should be built with library norms and fulfil the climate control strategies. It may preserve resources from light and heat and available for future generations.
- Libraries may use recycled materials like eco-friendly paints to renovate their spaces. • Library can use their roofs as green roofs that absorb rainwater, insulate buildings and create green space for users.
- Energy-efficient climate control can be achieved in the library buildings through natural lighting, solar panels, and LED lighting that reduces energy consumption and cost.
- Reuse of Library Materials, like resource sharing and outreach activities to donate books etc.
- Use papers, which can be recycled and save paper to minimise the waste.

Proper storage conditions, regular inspections of the stack area, also a preventive measure to protect library resources.

- De-acidification of papers is also a step towards sustainability. De- acidification is a process that involves treating paper with a mild alkaline solution to neutralise the acid in the paper. This process helps to preserve the paper and protect it from future atmospheric acid.
- Eco-friendly cleaning products can be used for cleaning the library's reading area and stack room.
- Encouraging digitalization of library operations like RFID enables self-service kiosk for issue/return and e-in-out system for entry of users, it reduces traditional paperwork and save the environment through saving paper and preserving books from improper handling.
- In view of sustainability, promote eBooks to reduce paper waste and physical storage needs.
- Digital Preservation with sustainable methods, such as transforming from physical copies to digital formats, to reduce resource consumption and storage space.
- Minimising the environmental impact of digital systems by opting for energy-efficient servers, data centres, and green IT technologies.
- Libraries are adopting practices like server virtualisation and cloud computing to reduce energy consumption.
- Encouraging e-books, audiobooks, and digital media lending to reduce paper waste.
- Introduce awareness programs or workshops into library activities to minimise environmental impact while maximising the lifespan of library collections.
- Use of non-toxic, eco-friendly methods to prevent damage from insects and pests that affect library materials.
- Integrated pest management (IPM) techniques that minimise chemical use while ensuring effective protection.
- Libraries should make sustainable procurement. Library collections and operational materials are sourced eco eco-friendly. Books must be printed on acid-free paper. Stationery materials are eco-friendly. Furniture should be made of sustainable materials like bamboo.

Following is the list of benefits of green design that may be common in case of green library too:

- (a) Minimized energy usage without compromising comfort levels
- (b) Preservation of natural regions, ecosystems, and wildlife Reduction of soil erosion and other related issues
- (c) Reducing pollution in the air and water (directly beneficial to health)
- (d) Reduction in water usage
- (e) Limiting the production of waste by implementing recycling and reuse practices
- (f) Low pollution levels



- (g) Increase in user productivity
- (h) Enhanced reputation and marketability

6. CONCLUSION

This study explores the various sustainable practices for library resources. Sustainable practices include green building, energy-efficient equipment, sustainable procurement of library resources, digitalisation of libraries for library operations, digitisation of library books, and awareness programs for the users. Sustainable practices make a place not only in the library infrastructure but also in the library operations. There are many challenges to adopting sustainable practices, which are capable of minimising the environmental impact. Besides all of these challenges, a sustainable library meets the requirements of the users without any negative impact of its services and preserves the library resources. India and other countries have also taken some initiatives towards sustainability. Libraries are the backbone of any institute; if libraries become sustainable then the Institute University, the city and the country will become sustainable. The suggestion from our side is that the library should use less paper, environmentally friendly materials in library preservation practices. Old library buildings can be converted into green roofs of their libraries to keep them cool. Library management should prepare guidelines for the preservation of library materials in a sustainable way. At the end of this paper, it is come to know that sustainability is a pure practice to preserve our earth, our planet and it starts from ourselves.

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